MPR 8730.5
REVISION I
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MARSHALL PROCEDURAL REQUIREMENTS

AD01

CONTROL OF INSPECTION, MEASURING, AND TEST EQUIPMENT

DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Canceled)	Document Revision	Effective Date	Description
Baseline		5/14/99	Document converted from MSFC-P11.1 to a Directive. Previous history retained in system as part of cancelled or superseded ISO Document files.
Revision	A	8/16/99	Changed Responsible organization code. Added applicable documents. Added definition of "Calibration Contact Code". Added definition of "Interval". Deleted definition of NASA Metrology and Information System. Renumbered subsequent paragraphs. Added MCMS Web page to definition of "Marshall Calibration Management System". Modified definition of "NASA/MSFC Limited Calibration Sticker". Modified definition of "Non-Government Owned Test Equipment". Deleted reference to MSFC-P11.1 from definition of Test Software. Modified paragraph 2.1.7. Added paragraph 2.1.8. Renumbered subsequent paragraphs. Deleted Appendix H and added reference to MCMS Web Page from note associated with paragraph 2.1.19. Added paragraph 2.5.19. General revision to Appendix A. Added MSFC Form Numbers 4365 and 4364. Modified Form 4114. Modified Tag 15. Modified Appendix E. Changed Form 2035 to MSFC Tag 17. Deleted Appendix H. Deleted Appendix C, D, F, G, H. Re-labeled Appendix E to Appendix C. Deleted Referenced thereto. Updated table of contents. Added ISO 10012 to "References". Updated Organization Codes and names. Added permit to use indicators for Category III equipment to Appendix A and paragraph 1.8.
Revision	B	12/6/99	Add Appendix D to the Table of Contents. Add paragraph 2.5.26. Change Record Control Organization from the ULO to the MSFC Calibration Facility paragraph 4.1.2. Added Appendix D. Changed "should" to "is to" paragraph 2.2.3. Changed retention period paragraph 4.1.8. Modified paragraph 1.15. References to MSFC-P11.1 replaced with date paragraph 4.1.12. Changed retention period of paragraph 4.1.10 and 4.1.12 from 2 to 5 years. Added disposition statements to Section 4
Revision	C	6/13/00	Deleted references to MPG 1441.1 and replaced with applicable document MPG 1440.2. Incorporated title change of MWI 5330.1. Modified paragraph 2.1.18. Modified paragraphs 2.3 and 2.3.1. Added paragraph 2.5.27. Relocated note from paragraph 2.3.1 to 2.7. Modified paragraph 3.4.1. Added description of standard report #9 and #10 to Appendix C. Minor editorial changes throughout.
Revision	D	11/13/00	Revised definition of Recall Report (paragraph 1.16). Eliminated S&MA concurrence on extending calibration period with the exception of flight hardware and associated ground support equipment (paragraph 2.1.21.1). Added note to paragraph 2.1.12. Modified Appendix A to include items requiring periodic servicing and maintenance as Category 1. Added Category VI to Appendix A for equipment requiring "initial calibration only" which also required change to paragraph 2.1.8. Changed "Laboratory" to "Facility" in paragraph 2.2.1.
Revision	E	2/27/01	Added paragraph 1.24 Definition of "Verification." Modified paragraph 2.1.3.3 to include verifications. Modified paragraph 2.1.3.4 to include verification.
Revision	F	7/02/01	Added Funding requirement to paragraph 1.15. Added automated calibration to note following paragraph 2.1.2. Added clarification to paragraph 3.2.2. Modified retention requirements in Section 4.
Revision	G	1/29/03	Replaced Inspection, Measuring, and Test Equipment with IM&TE in several places. Replaced ISO 9002 with ISO 9001 in several places.

			Revised "ANSI/NCSL" from "NCSL/ANSI" and the title. Replaced ISO Guide 25 from Reference Section with ISO 17025. Added paragraph 1.5 on Equipment Categories. Major change is the combination of Categories IV and V, and changed Category VI to V. In paragraph 1.6 added "for capital equipment" and deleted "assigned to the test equipment" to clarify. In 1.7, combined sentence from 1.21. Moved last sentence in 1.9 to Appendix A. In paragraph 1.14 added "for IM&TE which does not have an ECN number assigned" and " when a NASA property ECN bar code label does not exist". Added "in 30 days", "in 60 days", and deleted "and will list overdue items only once" in Paragraph 1.17. Deleted first sentence in 1.2.1. In paragraph 2.1.3.9, added "limited" and deleted the last sentence. Moved " and notify the MSFC Calibration Facility Technical Monitor of any changes " in paragraph 2.1.4 to clarify. Deleted paragraph 2.1.5. In 2.1.5, added, "to accompany flight hardware, qualification hardware, or ground support equipment interfacing with flight hardware, and, at the discretion of the ULO, development hardware that could directly and significantly affect design of flight hardware. This tracking record will identify use of "and "Calibration of Category IV equipment prior to use or on a periodic interval will be noted in the tracking record." Added "or is within calibration interval" in paragraph 2.1.10. Added "calibration" in 2.1.16. Deleted last sentence of paragraph 2.1.18. Deleted 2.2.2.3. Deleted "Cal Mgr. No" in paragraph 2.2.2.5. In paragraph 2.2.4, added "by re-categorizing it" and deleted the last sentence. In paragraph 2.5.4, added "available" and "if". In paragraph 2.5.9, added "on-site". In 2.5.13, added "the data for". In paragraph 2.5.16, delete the last sentence. Add paragraph 2.5.21. Deleted paragraph 3.2.2. Added "notify calibration contact when equipment is being sent to OCV" in paragraph 3.2.8. Added filing and retention schedule in 4.1. Deleted paragraphs 4.1.11 and 4.1.12. In Appendix A replaced "calibration date" for "calibration status". Delete sentences in A.3, A.4, and A.5 that were moved to paragraph 1.5. Delete last sentence in A.4. In A.5, add "and shall only indicate the equipment is classified as Category III." Deleted last 3 sentences in A.6. Delete first sentence in A.7, and added "MSFC Calibration Facility will be contacted for verification that the IM&TE is appropriate for this category, and if so, will assign a NASA Calibration Control Number to the IM&TE unless it already has an ECN number, and issue …" Deleted last Note in paragraph A.7. In C.1.9, added "Category I test equipment listed here has already been given a 7 day grace period past its expiration date". Add paragraph C.1.11 and C.1.12. In C.2.1, added "NASA Calibration Control Number". In C.2.4, added "to the Army are at least 30 working days" to the last sentence. Deleted first two sentences in C.2.5.
Revision	H	7/17/2003	Change Section 2.1.3.3 to read: "Calibrations and verifications must employ a defined process (procedure), including: details of equipment utilized to perform the calibration or verification (equipment type, unique identification, such as model and serial number, equipment location); frequency of the calibration/verification (i.e. before each use, every 6 months, etc.); acceptance criteria (included in the procedure); and the action to be taken when results are unsatisfactory." Change sentence in 1.10 from "Intervals are determined by manufacturer's recommendations, experience, or statistical analysis of the "as found" condition of the IM&TE." To "The Calibration Facility determines calibration intervals based on such things as manufacturer's recommendations, Military designations, etc."
Revision	I	9/27/2004	Change MPG's to MPR's; Numerous punctuation, acronym, and grammatical corrections. Change must, should, and will to shall where

			applicable. Changed Section 1.16 to read: "Any test equipment or measuring device owned by a contractor employee, vendor, or corporation that is used as described in Appendix A, paragraph A.2." Section 2.1.6 was added to include requirements that were in the definitions section of 1.16 Non-Government-owned test equipment. In section 1.23, Test Software definition, the second sentence was deleted and the third sentence moved to section 2.1.7.7. Changed sentence in 2.2.2 to read "The information shall be provided on an MSFC Tag 15, an MSFC Form 4316, a marked up copy of the recall report, or an MCMS Web Page report. Added Section 2.3.2. In 2.5.14, deleted sentence "Privately-owned equipment used at MSFC will be tracked by serial number only." Deleted 2.5.22 and included it in 2.5.19. Some items that were previously "Notes" are now included in the numbered paragraph sections, resulting in re-numbering. Procedural steps in Section 3 were rewritten as requirements.

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PREFACE

P.1 PURPOSE

The purpose of this document is to establish a comprehensive calibration and metrology program which provides for the management of standards; inspection, measurement, and test equipment; and test software in a controlled process. This procedure is to define the method and responsibilities for the control of Inspection, Measuring, and Test Equipment (IM&TE) at Marshall Space Flight Center (MSFC) to meet the requirements of MPD 1280.1, "Marshall Management Manual."

P.2 APPLICABILITY

This Directive is applicable to all Center organizations and to all onsite contractors performing work under the MSFC Quality System or this Directive.

P.3 AUTHORITY

NPD 8730.1, "Metrology and Calibration"

P.4 APPLICABLE DOCUMENTS

a. ANSI/NCSL Z540.1 1994, "Calibration Laboratories and Measuring and Test Equipment-General Requirements"

b. ISO 9001, "Quality Management Systems – Requirements"

c. MPD 1280.1, "Marshall Management Manual"

d. MPR 1280.7, "Servicing"

e. MPR 1440.2, "MSFC Records Management Program"

f. MPR 5000.1, "Purchasing"

g. MWI 1280.3, "Corrective/Preventive Action Notification System"

h. MWI 5330.1, "Evaluation of Contractors, Suppliers, and Vendors"

i. NPD 8730.1, "Metrology and Calibration"

P.5 REFERENCES

a. ISO 10012, "Quality Assurance Requirements for Measuring Equipment"

b. ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories"

P.6 CANCELLATION

MPG 8730.5H dated July 17, 2003

Original signed by
Robin N. Henderson for

David A. King
Director

DOCUMENT CONTENT

1. DEFINITIONS

1.1 Calibration. The set of operations which establish, under specified conditions, the relationship between values indicated by a measuring instrument or measuring system, and the corresponding standard or known values derived from the standard.

1.2 Calibration Contact. An individual appointed to act as a single point of contact for one or more pieces of test equipment.

1.3 Calibration Contact Code. A 6-digit code assigned by the MSFC Calibration Facility to a Calibration Contact. The calibration contact code is used by the Marshall Calibration Management System (MCMS) to tie IM&TE to the responsible Calibration Contact. The code usually, but not always, consists of the first four digits of the contact's last name and the last two digits of the contact's building number. The current list of calibration contact codes is available from the MCMS Web Page. A Calibration Contact can have more than one contact code.

1.4 Calibration Decal - MSFC Form 4365. A decal (see Appendix B for example) that is assigned by the MSFC Calibration Facility to a calibrated piece of test equipment showing the test equipment has received a full calibration, the calibration due date, and the stamp of the technician who performed the calibration. The decal may be affixed to the equipment, to a tag affixed to the equipment, or the case or container associated with the test equipment. Note: A missing or illegible decal does not void the calibration of the test equipment, provided the calibration records show the equipment calibration as current.

1.5 Equipment Categories. Equipment is designated being in a particular calibration category depending on whether the calibration is performed by the Using Line Organization (ULO), the Calibration Facility or outside vendor, or if the equipment does not require calibration. See Appendix A for details concerning Equipment Categories.

1.5.1 Category I. The calibration is performed by the Calibration Facility or an outside vendor and is done on an established interval. The calibration contact is notified by the recall system when this equipment needs to be calibrated. Equipment in this category includes flight hardware, ground support equipment that interfaces with flight hardware, equipment essential for the safety of MSFC personnel, and any other equipment where accuracy and dependability are essential.

1.5.2 Category II. The calibration is performed by the Calibration Facility or an outside vendor when requested by the ULO. Infrequently used IM&TE should be included in this category.

1.5.3 Category III. IM&TE that is not calibrated. Equipment in this category is not used to perform inspections, take measurements, or collect data on flight hardware or ground support equipment that interfaces with flight hardware, but used as an indication only.

1.5.4 Category IV. IM&TE that is calibrated prior to use or on a periodic interval by the ULO.

1.5.5 Category V. IM&TE that is calibrated initially as part of the manufacturing process and requires no periodic calibration because the item is a physical object whose properties are intrinsic and remain stable with respect to time and use.

1.6 Equipment Control Number (ECN). A unique number assigned to equipment by the Property Management Group for capital equipment. The numbers are imprinted on a bar code label. The bar code may be affixed to the equipment, to a tag affixed to the equipment, or the case or container associated with the test equipment. Note: A missing or illegible ECN does not void the calibration of the test equipment, provided the calibration records show the equipment calibration as current.

1.7 Inspection, Measuring, and Test Equipment (IM&TE). All of the measuring instruments, measurement standards, reference materials, auxiliary apparatus, and software that are integral to an instrument. This term includes instruments and measuring equipment used in the course of testing and inspection to determine the characteristics or conformance to specifications of an article, material, system, process, or environment as well as that used in calibration. This term is used interchangeably with “test equipment” within this MPR.

1.8 Incidental Test Equipment. Equipment used in support of an inspection, measurement, or test that is not used to gather data. Incidental test equipment does not require calibration prior to use. Inputs/outputs of incidental test equipment are to be monitored by calibrated equipment. Examples of incidental test equipment include (but are not limited to) power supplies and load banks.

1.9 Indicator. A decal or sticker that shows the calibration status of a piece of test equipment that was calibrated by a ULO of MSFC. An indicator may be similar to a calibration decal issued by the MSFC Calibration Facility but should be unique to the organization that performed the calibration.

1.10 Interval. The period of time between the day a calibration is performed and the day the calibration is scheduled to expire. The MSFC Calibration Facility determines calibration intervals based on such things as manufacturer’s recommendations, military designations, etc. Intervals are expressed in terms of months in the MCMS.

1.11 Limited Calibration. A calibration that does not necessarily restore all parameters of an instrument to original specifications. A “Limited Use Calibration” decal is assigned by

the MSFC Calibration Facility to those instruments and is to be supported by a NASA/MSFC Limited Calibration sticker, MSFC Form 4114 (see Appendix B for example), or other supporting document, providing additional information that describes the limited calibration condition. This category applies to:

1.11.1 Instruments which cannot be restored to original specifications due to non-availability of parts, prohibitive costs, lack of capability, or other considerations;

1.11.2 Instruments which have no parameters to be calibrated and for which a function or verification check only has been performed; or

1.11.3 Instruments for which full calibration of all ranges is not required by the user.

1.12 Limited Use Calibration Decal - MSFC Form 4364. A decal (see Appendix B for example) that is assigned to a piece of test equipment by the MSFC Calibration Facility, indicating the calibration was limited, the calibration due date, and the stamp of the technician who performed the calibration. The decal may be affixed to the equipment, to a tag affixed to the equipment, or the case or container associated with the test equipment. Note: A missing or illegible decal does not void the calibration of the test equipment, provided the calibration records show the equipment calibration as current.

1.13 Marshall Calibration Management System (MCMS). A data base operated by the MSFC Calibration Facility. The MCMS generates the monthly recall report and stores calibration data for test equipment. Certain data reports are available to Center personnel through the MCMS Web Page. The MCMS Web Page is available at http://inside.msfc.nasa.gov/CALLAB/. Use of the MCMS Web Page is described in Appendix C.

1.14 NASA Calibration Control Number. A unique number assigned to equipment by the MSFC Calibration Facility for IM&TE which does not have an ECN number assigned. The numbers are imprinted on a bar code label that may be affixed to the equipment, to a tag affixed to the equipment, or the case or container associated with the test equipment. Note: A missing or illegible Calibration Control Number does not void the calibration of the test equipment, provided the item is traceable through the serial number and the calibration records show the equipment calibration as current.

1.15 NASA/MSFC Limited Calibration Sticker - (MSFC Form 4114). A sticker (see Appendix B for example) that is attached to a piece of test equipment by the MSFC Calibration Facility indicating the calibration was limited. This sticker can be used in lieu of a Limited Use Calibration Decal. Additional information can be provided on an attached sheet or memo. The sticker may be affixed to the equipment, to a tag affixed to the equipment, or the case or container associated with the test equipment. Note: A missing or illegible sticker does not void the calibration of the test equipment, provided the calibration

records show the limits and conditions of the calibration and the calibration as current.

1.16 Non-Government-Owned Test Equipment. Any test equipment or measuring device owned by a contractor employee, vendor, or corporation that is used as described in Appendix A, paragraph A.2

1.17 Recall Report. A report that is generated by the MCMS showing test equipment designated for recall. The recall report indicates items due for calibration in 30 days, items that are due for calibration in 60 days, and all items that are overdue (delinquent) for calibration. Recall reports issued to customers of the MSFC Calibration Facility that are beyond the scope of the MSFC Management System are issued as a courtesy only.

1.18 Seal. Seals are attached to critical adjustment features of test equipment. The current calibration of the test equipment is void if a seal is broken.

1.19 Stamp. An imprint on the decal to authenticate the calibration and to identify the calibrator. Note: A missing or illegible stamp does not void the calibration of the test equipment, provided the calibration records show the equipment calibration as current.

1.20 Technical Monitor. The Calibration Facility Technical Monitor is an MSFC employee assigned to monitor the Calibration Facility Contractor, who also serves as liaison between the Calibration Facility Contractor and the various organizations of MSFC. The Technical Monitor serves as the individual responsible for this directive.

1.21 Test Equipment. This term is used interchangeably with “IM&TE” within this procedure.

1.22 Test Report. A report that gives correction, measured value(s), conditions of test, curves, charts, error limits, or other pertinent data required for achieving the lowest uncertainty from a standard or test instrument.

1.23 Test Software. Software that controls an automated test system or conditions a data signal from the point of measurement to the end point of use.

1.24 Traceability. The property of a result of a measurement whereby it can be related to appropriate standards, generally international or national standards, through an unbroken chain of comparisons.

1.25 Verification. An inspection or comparison that is performed to ensure the quality of the measured quantity meets or exceeds the user’s requirements for reliability and accuracy. A verification procedure is used to issue calibration or limited calibration stickers in lieu of a calibration procedure when no adjustment to the IM&TE is necessary.

2. RESPONSIBILITIES

2.1 Directors/Managers of the ULO or their designees shall:

2.1.1 Implement the calibration program as outlined herein.

2.1.2 Inform the MSFC Calibration Facility Technical Monitor when a requirement for new calibration support or additional capability is contemplated or realized to allow for coordination of manuals, spare parts, calibration standards, etc.

2.1.3 Avoid purchasing IM&TE without a calibration procedure. Some manufacturers will not provide calibration procedures to owners and therefore shall be avoided to minimize sole-source servicing costs.

2.1.4 Consider purchasing electronic equipment that is equipped with an IEE488 bus or an RS232 serial connection with the potential for automated calibration, which results in faster turnaround times and reduced calibration costs.

2.1.5 Determine whether IM&TE shall be calibrated by the MSFC Calibration Facility, OCV, or by the ULO itself. Due consideration shall be given to the resources available.

2.1.6 Require non-Government-owned test equipment to have proof of calibration certificate and traceability to a nationally or internationally recognized standards organization, such as the National Institute of Standards and Technology. Contractors that use non-Government-owned test equipment shall, at a minimum, meet ISO9001 or SAE 9100 requirements. Safety and Mission Assurance directorate shall approve the use of this equipment by verifying the calibration certification and traceability. When performing work at a customer's off-site location, utilizing customer-owned IM&TE, proof of calibration certification and traceability shall also be verified. Verification of calibration and use of customer-owned IM&TE shall be addressed in the servicing plan which is a requirement of MPR 1280.7, "Servicing." Funding shall be provided by the ULO to cover all costs associated with the calibration of non-Government-owned test equipment via customer agreement.

2.1.7 Develop procedures that define calibration operations and software verifications performed by the ULO. Procedures shall meet the following as a minimum:

2.1.7.1 Calibration of equipment shall be performed prior to use of the equipment, prior to use for a test series, or at prescribed intervals.

2.1.7.2 Calibrations shall be traceable to certified equipment having a known valid relationship to nationally or internationally recognized standards. Where no such standards exist, the basis used for calibration shall be documented.

2.1.7.3 Calibrations and verifications shall employ a defined process (procedure), including details of equipment utilized to perform the calibration or verification (equipment type, unique identification, such as model and serial number, equipment location), frequency of the calibration/verification (i.e., before each use, every 6 months, etc.), acceptance criteria (included in the procedure), and the action to be taken when results are unsatisfactory.

2.1.7.4 Calibrations and verifications shall be documented. Records shall address requirements of 2.1.7.1 through 2.1.7.3.

2.1.7.5 Indicators and their use shall be described by Organizational Work Instruction.

2.1.7.6 Calibrations performed by the ULO shall be valid for a limited time period. The period for a given piece of IM&TE shall be as recommended by the manufacturer. In the absence of a recommendation from the manufacturer, the interval shall not exceed 1 year.

2.1.7.7 Test software shall be verified when it is installed into test equipment or a facility prior to use. Test software used successfully prior to February 23, 1998, is deemed to be verified by demonstration. Any revisions to test software subsequent to February 23, 1998 shall be verified prior to use.

2.1.7.8 Revisions made to test software shall be verified prior to use.

2.1.7.9 Proprietary software that is an integral part of test equipment purchased from a manufacturer shall be certified by the manufacturer. If this certification is limited, not available, or cannot be obtained from the vendor, the software shall be verified by the user.

2.1.7.10 Test software verifications shall be documented in sufficient detail as to permit the repetition of the validation. Record retention shall be as determined by the ULO.

2.1.7.11 Test software verifications performed by the ULO are valid until the test software or hardware is modified.

Note: ISO 10012-1, Quality Assurance Requirements for Measuring Equipment - Part 1: Metrology Confirmation System for Measuring Equipment can be used as a guide.

2.1.8 Designate one or more calibration contacts in each using organization to interface with the MSFC Calibration Facility concerning test equipment for that particular organization, and notify the MSFC Calibration Facility Technical Monitor of any changes.

2.1.9 Establish a tracking record to accompany flight hardware, qualification hardware, or ground support equipment interfacing with flight hardware and, at the discretion of the ULO, development hardware that could directly and significantly affect design of flight hardware. This tracking record shall identify use of Category I, Category II, and Category IV test

equipment to trace the use of test equipment in the event a piece of test equipment is found to be out of calibration after use. Calibration of Category IV equipment prior to use or on a periodic interval shall be noted in the tracking record.

2.1.10 In the event a piece of test equipment has a disposition tag assigned or is otherwise found to be out of calibration, review documentation and disposition the validity of previous inspection and test results to determine the subsequent action required. Refer to MWI 1280.3, "Corrective/Preventive Action Notification System."

2.1.11 Assist the MSFC Calibration Facility in maintaining the list of calibration contacts and calibration contact assignments of Category I, Category II, and Category V test equipment contained in the MCMS. Input from the ULO is limited to the calibration contact, the calibration contact's organization code, proper calibration contact/IM&TE assignment, and equipment category code. Input from the ULO shall be kept current. Note: IM&TE shall not be dropped from a calibration contact without a reassignment of the IM&TE to another calibration contact unless the item is classified as "EXCESS." This information can be viewed at: http://inside.msfc.nasa.gov/CALLAB/.

2.1.12 Maintain a list of Category IV test equipment for which each calibration contact is responsible. This list shall be kept current. The list shall include:

2.1.12.1 The ECN, if assigned.

2.1.12.2 Equipment manufacturer.

2.1.12.3 Equipment model number.

2.1.12.4 Nomenclature (item name).

2.1.12.5 Equipment serial number.

2.1.12.6 Category.

2.1.12.7 Calibration contact.

2.1.13 Ensure that test equipment utilized as Category I or Category II (see Appendix A) has a current calibration decal or limited use calibration decal before use.

2.1.14 Ensure that test equipment utilized as Category IV is calibrated before use or is within its calibration interval.

2.1.15 Determine the measurements being made, the accuracy required, and select the appropriate IM&TE that is capable of the necessary accuracy and precision.

NOTE: Calibrations performed by the MSFC Calibration Facility and outside vendors are to manufacturer's specifications.

2.1.16 Request calibration test reports as required to support ULO activities.

2.1.17 Ensure that the environmental conditions are suitable for the calibrations, inspections, measurement, and tests being performed by the ULO.

2.1.18 Ensure that IM&TE is stored, handled, and used in such a manner as to maintain its accuracy and fitness for use.

2.1.19 Ensure that IM&TE is clean and free of process fluids prior to delivery or pick up to the MSFC Calibration Facility. Unacceptable items shall be returned to the calibration contact unserviced.

2.1.20 Request repair from the ISC for IM&TE that is in need of repair. See Section 3.3.

2.1.21 Select Outside Calibration Vendors (OCVs) that are capable of performing the repair/calibration required when calibration services are procured by the ULO. The OCV shall as a minimum meet the requirements of paragraph 2.7. A copy of the OCV's calibration certification shall accompany the calibration records.

2.1.22 Ensure the requirements of MWI 5330.1, "Evaluation of Contractors, Suppliers, and Vendors," are fulfilled for calibrations that are procured by the ULO.

2.1.23 Request for priority calibration (MSFC Form 4277) shall only be used when a normal 10 workday (see note below) turnaround is unacceptable and justified.

NOTE: The MSFC Calibration Facility uses outside resources to perform some calibrations. Items may be sent to manufacturers, vendors, the Army at Redstone Arsenal, or any of the other NASA Centers. Turnaround times from these outside sources are typically 30 working days. The turnaround times stated are intended as a guide and are not a requirement of this procedure. Note: The MCMS Web Page displays the performing organization to assist the ULO in planning their calibration needs.

2.1.24 Direct complaints regarding the work performed by the MSFC Calibration Facility to the Technical Monitor of the Calibration Facility via E-mail.

2.1.25 The calibration period for IM&TE in use for a test or series of tests shall be extended as needed to complete the test provided that:

2.1.25.1 The department manager concurs. S&MA concurrence shall be required when calibration periods are extended for IM&TE used on or in association with flight hardware or

associated ground support equipment (documentation required per paragraph 4.1.13).

2.1.25.2 The IM&TE receives a "post-use verification" to determine the "as-found" condition of the IM&TE at the completion of the test.

2.1.25.3 The results of the post-use verification are considered before final acceptance of the test.

Note: The as-found condition of most IM&TE is dependent on time, use, and handling.

2.2 The Calibration Contact(s) shall:

2.2.1 Be the interface with the MSFC Calibration Facility for test equipment calibration for their organization. The calibration contact(s) shall be identified to the MSFC Calibration Facility. All test equipment processed to the MSFC Calibration Facility shall be routed through the calibration contact. Each piece of test equipment shall be assigned to only one calibration contact. The calibration contact shall assist the ULO directors/managers or their designees in meeting the requirements of Section 2.1.

2.2.2 Ensure that the MSFC Calibration Facility is given the following information with each piece of test equipment as it is submitted for calibration. The information shall be provided on an MSFC Tag 15, an MSFC Form 4316, a marked up copy of the recall report, or an MCMS Web Page report. The required information includes:

2.2.2.1 The ECN, if assigned.

2.2.2.2 Item name.

2.2.2.3 Pickup/delivery building number.

2.2.2.4 Pickup/delivery room number.

2.2.2.5 Calibration contact.

2.2.2.6 Organization mail code.

2.2.3 Submit new Category I and Category II test equipment for an initial calibration after it arrives at the Center. If the test equipment was vendor-calibrated at the time of purchase, an initial calibration shall be performed only at the request of the ULO. A copy of the calibration records shall be submitted to the MSFC Calibration Facility so that a calibration decal can be assigned to the equipment prior to use.

2.2.4 Respond to the monthly recall report by submitting the test equipment for calibration or

requesting the item be removed from recall status by re-categorizing it.

2.2.5 Notify the MSFC Calibration Facility of all test equipment placed on excess so that the test equipment can be placed on a non-recall status and subsequently purged from the records after the retention period is satisfied.

2.3 The Director, Safety & Mission Assurance Directorate, shall:

2.3.1 Assist in ensuring the requirements of MWI 5330.1, "Evaluation of Contractors, Suppliers, and Vendors," are fulfilled for MSFC OCV contracts/purchase agreements.

2.3.2 Verify proof of calibration certificate and traceability to a nationally or internationally recognized standards organization of any test equipment or measuring device owned by a contractor employee, vendor, or corporation and used as described in Appendix A, paragraph A.2.

2.4 The Manager, Facilities Engineering Department, Center Operations Office, shall:

2.4.1 Provide a calibration service to operate the MSFC Calibration Facility. This service shall be purchased in accordance with MPR 5000.1, "Purchasing." The contractor shall be satisfactory to institutional needs and in compliance with Agency regulations and standards.

2.4.2 Monitor and evaluate the contractor's performance in accordance with MPR 5000.1 and the provisions of the contract.

2.4.3 Designate a Technical Monitor for the MSFC Calibration Facility. The Technical Monitor shall serve as the liaison among the MSFC Calibration Facility contractor, the ULOs at MSFC, other NASA installations, and other Government agencies. The Technical Monitor for the MSFC Calibration Facility shall also serve as the Office of Primary Responsibility of this directive.

2.4.4 Develop new calibration capabilities to support onsite MSFC program metrology requirements (within funding limits).

2.4.5 Provide formal and consistent representation and participation in the NASA Metrology/Calibration Working Group workshops, the National Conference of Standards Laboratories meetings, and other related activities.

2.4.6 Request periodic update of the ULO list of equipment (reference paragraph 2.1.12).

2.5 The MSFC Calibration Facility shall:

Note: This section applies to those functions performed by the MSFC Calibration Facility and

not to those functions performed by the ULOs under Section 3.1.

2.5.1 Establish and maintain documented procedures to control the internal operations of the MSFC Calibration Facility.

2.5.2 Establish and maintain documented procedures to calibrate and maintain inspection, measuring, test equipment, and test software.

2.5.3 Maintain a record system that contains sufficient information to permit the repetition of the calibration. The records shall include the identity of personnel involved in the preparation and calibration.

2.5.4 Provide appropriate calibration records and test reports if requested by the ULO.

2.5.5 Utilize metrology data banks and coordinate with other NASA field installations for calibration procedures to avoid unnecessary repetition of procedure development effort.

2.5.6 Utilize existing calibration resources of the military services, other civil agencies, original manufacturers, and the private sectors where in-house capabilities are not available or are overextended.

2.5.7 Support the calibration needs of other NASA installations and Government agencies when existing capacity and capability can provide for this support.

2.5.8 Provide qualified personnel to perform repairs and calibration work instructions.

2.5.9 Provide onsite pick up and delivery service for items that are to be calibrated.

2.5.10 Provide high-quality calibrations and reports for test equipment.

2.5.11 Provide each piece of equipment (calibrated within the MSFC Calibration Facility or outside calibration vendor) with a calibration decal or limited-use calibration decal.

2.5.12 Maintain measurement standards and traceability to the National Institute of Standards and Technology.

2.5.13 Operate and maintain the data for the MCMS for MSFC.

2.5.14 Ensure that all test equipment submitted for service is assigned an ECN or a calibration control number.

2.5.15 Ensure that all test equipment submitted for service is entered into the MCMS.

2.5.16 Generate a monthly recall report. This report shall be sent monthly to the calibration contact for use in scheduling test equipment for calibration.

2.5.17 Apply "calibration void if broken" seals on critical adjustment locations to prevent unauthorized adjustment of test equipment.

2.5.18 Provide repair service for test equipment to facilitate calibration or as part of a calibration procedure.

2.5.19 Assess the impact to IM&TE calibrated to a standard that was found to be out of tolerance. When the out-of-tolerance condition has been determined to have a detrimental effect on the accuracy of subordinate IM&TE, a Disposition Tag (MSFC Tag 17) shall be issued to each affected piece of IM&TE and the calibration contact notified via memorandum or e-mail that a disposition tag was assigned to test equipment.

2.5.20 Attach a Disposition Tag (MSFC Tag 17) to all test equipment returned to the calibration contact that was:

2.5.20.1 Out of tolerance. A detailed explanation of the out-of-tolerance condition shall be provided in the "Comments" section of the tag.

2.5.20.2 An item that will not calibrate to appropriate standards. If the item is returned to the calibration contact without a calibration or limited calibration being performed, the item shall be tagged with a Disposition Tag (MSFC Tag 17) and returned to the user with an explanation of the condition in the "Comments" section of the tag.

2.5.20.3 An item was found to have a broken seal. If an item is returned to the Calibration Laboratory with a broken seal, the last calibration shall be considered to be voided.

2.5.21 Notify the calibration contact via phone or e-mail if equipment sent for calibration is sent outside the MSFC Calibration Facility for any reason.

2.5.22 Ensure that IM&TE is stored and handled in such a manner as to maintain its accuracy and fitness for use.

2.5.23 Ensure that the environmental conditions are suitable for the calibrations being performed.

2.5.24 Maintain a listing of stamps used by employees performing calibrations that identifies the stamp and the individual to whom the stamp is assigned.

2.5.25 Be compliant with the ISO 9001 standard and the calibration laboratory competency requirements identified in ISO/IEC 17025 or ANSI/NCSL Z540-1 1994.

2.5.26 Post current calibration data at the intranet location as described in Appendix D.

2.5.27 Notify the NASA Equipment Management System (NEMS) operator of any equipment that has been sent offsite for calibration or repair services that has required more than 55 days to complete to facilitate the tracking of the item by the NEMS. The NEMS operator shall also be notified when the item has been returned.

2.6 The Institutional Services Contractor (ISC) shall remove any existing calibration or limited-use calibration decal that a repair performed by the ISC may have voided. Decals that are removed shall be returned to the customer with the repair receipt.

2.7 An Outside Calibration Vendor (OCV) shall:

2.7.1 OCVs shall be compliant with the ISO 9001 standard and the calibration competency requirements identified in ISO/IEC 17025, or ANSI/NCSL Z540-1 1994.

2.7.2 Determine and document the "as found" condition of IM&TE.

2.7.3 Repair (if necessary) and calibrate IM&TE against certified equipment having a known valid relationship to internationally or nationally recognized standards per approved procedure. Where no such standards exist, the basis used for the calibration shall be documented.

2.7.4 Return the IM&TE to MSFC and furnish a copy of the calibration records.

3. PROCEDURE

3.1 Calibrations performed by the ULO shall follow the steps listed below.

Actionee		Action
ULO	3.1	Determines that calibration is performed by the ULO.
ULO	3.1.1	Determines if repairs are required.
ULO	3.1.2	Requests repair by the ISC. See Section 3.3.
ULO	3.1.3	Calibrates IM&TE against certified equipment having a known valid relationship to internationally or nationally recognized standards per approved procedure. Where no such standards exist, the basis used for the calibration shall be documented.
ULO	3.1.4	Documents and maintains calibration record of IM&TE.

ULO 3.1.5 Assigns indicators (if used).

3.2 Calibrations performed by the MSFC Calibration Facility shall follow the steps below.

Note: Equipment sent to the MSFC Calibration Facility may be sent to a qualified OCV by the MSFC Calibration Facility.

ULO	3.2	Determines that calibration will be performed by or through the Calibration Facility.
MSFC Calibration Facility	3.2.1	Issues Recall Report.
Calibration Contact	3.2.2	Contacts the MSFC Calibration Facility and requests calibration services.
MSFC Calibration Facility/ULO	3.2.3	Determines if the test equipment shall be calibrated in-situ (where the test equipment is calibrated "in place") or moved to the MSFC Calibration Facility for calibration.
ULO	3.2.4	Notifies MSFC Calibration Facility that equipment is available for calibration.
Calibration Contact	3.2.5	Brings the test equipment to the MSFC Calibration Facility or requests pick up by the MSFC Calibration Facility.
MSFC Calibration Facility	3.2.6	Determines if the test equipment has been assigned an ECN or NASA Calibration Control Number.
MSFC Calibration Facility	3.2.7	Assigns a NASA Calibration Control Number to test equipment if an ECN or NASA Calibration Control Number does not already exist or has been lost.
MSFC Calibration Facility	3.2.8	Logs the test equipment into the MCMS.
MSFC Calibration Facility	3.2.9	Determines if calibration will be performed by the MSFC Calibration Facility or by outside calibration vendor. If equipment is calibrated by an OCV, go to Section 3.4. Notify calibration contact when equipment is sent to OCV.
MSFC Calibration	3.2.10	Determines and documents the "as found" condition of the

Facility		test equipment.
MSFC Calibration Facility	3.2.11	Determines if repairs are needed. If the repair is incidental to calibration, the repair shall be performed by the MSFC Calibration Facility. If the equipment is inoperable or repair exceeds those incidentals for calibration, the repair shall be performed by the ISC. If equipment is to be repaired by the ISC, go to Section 3.3.
MSFC Calibration Facility	3.2.12	Repairs the test equipment. *Note: Items considered as infeasible to repair shall be tagged with a Disposition Tag (MSFC Tag 17) and returned to the user with an explanation as to why the equipment was not repaired in the "Comments" section of the tag.*
MSFC Calibration Facility	3.2.13	Calibrates IM&TE against certified equipment having a known valid relationship to internationally or nationally recognized standards per approved procedure. Where no such standards exist, the basis used for the calibration shall be documented.
MSFC Calibration Facility	3.2.14	Assigns a calibration decal or limited-use calibration decal to the test equipment and other tags and stickers as required.
MSFC Calibration Facility	3.2.15	Updates the test equipment records.
MSFC Calibration Facility	3.2.16	Returns the test equipment to the calibration contact.

3.3 Repairs performed by ISC shall follow the steps below.
Note: Equipment repaired by the ISC shall be repaired and adjusted to manufacturer's tolerances. This adjustment does not constitute calibration.

ULO/ MSFC Calibration Facility	3.3.1	Requests repair.
ISC	3.3.2	Assigns a service order number for repair.
ISC	3.3.3	Repairs (and adjusts) customer item.

ISC	3.3.4	Removes any existing Calibration or Limited-Use Calibration decal that the repair may have voided.
ISC	3.3.5	Returns the test equipment to the organization that requested repair. Calibration or Limited-Use Calibration decals that were removed by the ISC are to be returned to the user with the Service Order Form.

3.4 Calibrations performed by OCV shall follow the steps below.

Note: Calibration by OCV can be procured directly by the ULO or through the MSFC Calibration Facility. A NASA Calibration or NASA Limited-Use Calibration decal is required for items calibrated by OCV.

Note: For items that are routinely serviced by the manufacturer and are anticipated to have continued use, it may be cost effective to procure calibration services through a service agreement with the manufacturer. Service agreements may not be all inclusive and may contain exceptions.

ULO/ MSFC Calibration Facility	3.4.1	Selects OCV that has the capability to repair (if required) and calibrate IM&TE. The OCV shall meet the requirements stated in section 2.7. The ULO is responsible for ensuring the requirements of MWI 5330.1, "Evaluation of Contractors, Suppliers, and Vendors," are fulfilled for the OCV (see paragraph 2.3). Services procured by the MSFC Calibration Facility contractor shall be in accordance with their quality plan.
OCV	3.4.2	Determines and documents the "as found" condition of the IM&TE.
OCV	3.4.3	Repairs and calibrates IM&TE against certified equipment having a known valid relationship to internationally or nationally recognized standards per approved procedure. Where no such standards exist, the basis used for the calibration shall be documented.
OCV	3.4.4	Vendor returns IM&TE to MSFC with calibration records.
ULO	3.4.5	Forwards copy of calibration records to MSFC Calibration Facility for record retention and issuance of decal, stickers, and tags.

MSFC Calibration Facility	3.4.6	Performs steps 3.2.15 and 3.2.16.

3.5 New Equipment.

Note: Calibration of new equipment by the Equipment Vendor can be procured directly by the ULO at the time of purchase. A NASA Calibration or NASA Limited-Use Calibration decal is required for items calibrated by OCV.

ULO	3.5.1	Takes possession of new equipment.
ULO	3.5.2	Assigns calibration contact.
ULO	3.5.3	Categorizes equipment per Appendix A.
ULO	3.5.4	Determines if new IM&TE was calibrated by vendor.
Calibration Contact	3.5.5	Forwards copy of calibration records to MSFC Calibration Facility for record retention and issuance of calibration decal.
MSFC Calibration Facility	3.5.6	Performs steps 3.2.15 and 3.2.16.
ULO	3.5.7	Calibrates new equipment that requires calibration via Section 3.1, 3.2, or 3.4 of this procedure.

4. RECORDS

4.1 Records shall be retained in accordance with MPR 1440.2. Records shall be filed and retained in accordance with proposed schedule number 8, Agency filing scheme number 8730, to retain onsite for a minimum of 3 years and to destroy records per superseded cycle or 3 years after calibration activity is discontinued. The records required by other procedures referenced herein are not included here. The records required by this procedure are as follows:

4.1.1 “Calibration Records” and “Software Verifications” generated by the ULO (paragraphs 2.1.7.4 and 2.1.7.10). The record control organization for these records is the ULO. The retention period for these records shall be determined by the ULO. The minimum retention for calibration records is 3 years. The minimum retention for software verification is 3 years after the software was last modified or retired. Disposition of these records at the end of the retention period shall be determined by the ULO.

4.1.2 “Calibration Contact” (paragraph 2.1.8). The record control organization for this record is the MSFC Calibration Facility. The MSFC Calibration Facility shall maintain a list of

calibration contact(s) in the MCMS. The list is available from the MCMS Web Page.

4.1.3 "Tracking Record" (paragraph 2.1.9). The record control organization for this record is the ULO. The ULO shall determine and document the retention period for this record with due consideration as to the use of the test equipment involved. The minimum retention period for this record is 3 years or until the "as found" condition of the equipment was determined to be within tolerance at the subsequent calibration. Disposition of these records at the end of the retention period shall be determined by the ULO.

4.1.4 "Disposition" (paragraph 2.1.10). The record control organization for this record is the ULO. This record shall be retained for a minimum of 3 years. Disposition of these records at the end of the retention period shall be determined by the ULO.

4.1.5 "Test Equipment" (paragraph 2.1.12). The record control organization for this record is the ULO. This record shall be maintained current in the MCMS. Disposition of these records is as described in paragraph 4.1.10.

4.1.6 "Calibration Test Report" (paragraph 2.1.16). The record control organization for this record is the MSFC Calibration Facility. The retention period for this record shall be determined by the ULO. The minimum retention period for this record shall be 3 years. These records shall be discarded after the retention period is satisfied.

4.1.7 "Vendor Certification" (paragraph 2.1.21). The record control organization for this record is the MSFC Calibration Facility. "Vendor Certifications" obtained by the ULO shall be forwarded to the MSFC Calibration Facility. The retention period for this record shall be 3 years. These records shall be discarded after the retention period is satisfied.

4.1.8 "Calibration Records from OCVs" (paragraph 3.4.5). The record control organization for these records is the MSFC Calibration Facility. Reports obtained by the ULO shall be forwarded to the MSFC Calibration Laboratory. The retention period for these records shall be as specified in paragraph 4.1.10. These records shall be discarded after the retention period is satisfied.

4.1.9 "Traceability" (paragraphs 2.5.3 and 2.5.12). The record control organization for the referenced paragraphs is the MSFC Calibration Facility. These records shall be retained for 3 years beyond their expiration date. These records shall be discarded after the retention period is satisfied.

4.1.10 "MCMS System" (paragraph 2.5.13). The record control organization for the MCMS is the MSFC Calibration Facility. This record shall be kept current with a minimum of the last five calibrations performed on each piece of test equipment entered into the system. The MCMS shall also be maintained so that production reports for the previous calendar year, the previous fiscal year, and the previous contract year are available. The data base of the obsolete NMIS System shall be retained either electronically or in hard copy form for at least 5 years. These

records shall be erased after the retention period is satisfied.

4.1.11 "Disposition Tag Notifications" (paragraph 2.5.19). The record control organization for the referenced paragraph is the MSFC Calibration Facility. These records shall be retained for three years. These records shall be discarded after the retention period is satisfied.

4.1.12 "Listing of Stamps" (paragraph 2.5.24) - The record control organization for the referenced paragraph is the MSFC Calibration Facility. The list shall be kept current and maintained as a permanent record. This record shall be destroyed 3 years after the calibration activity at MSFC is discontinued.

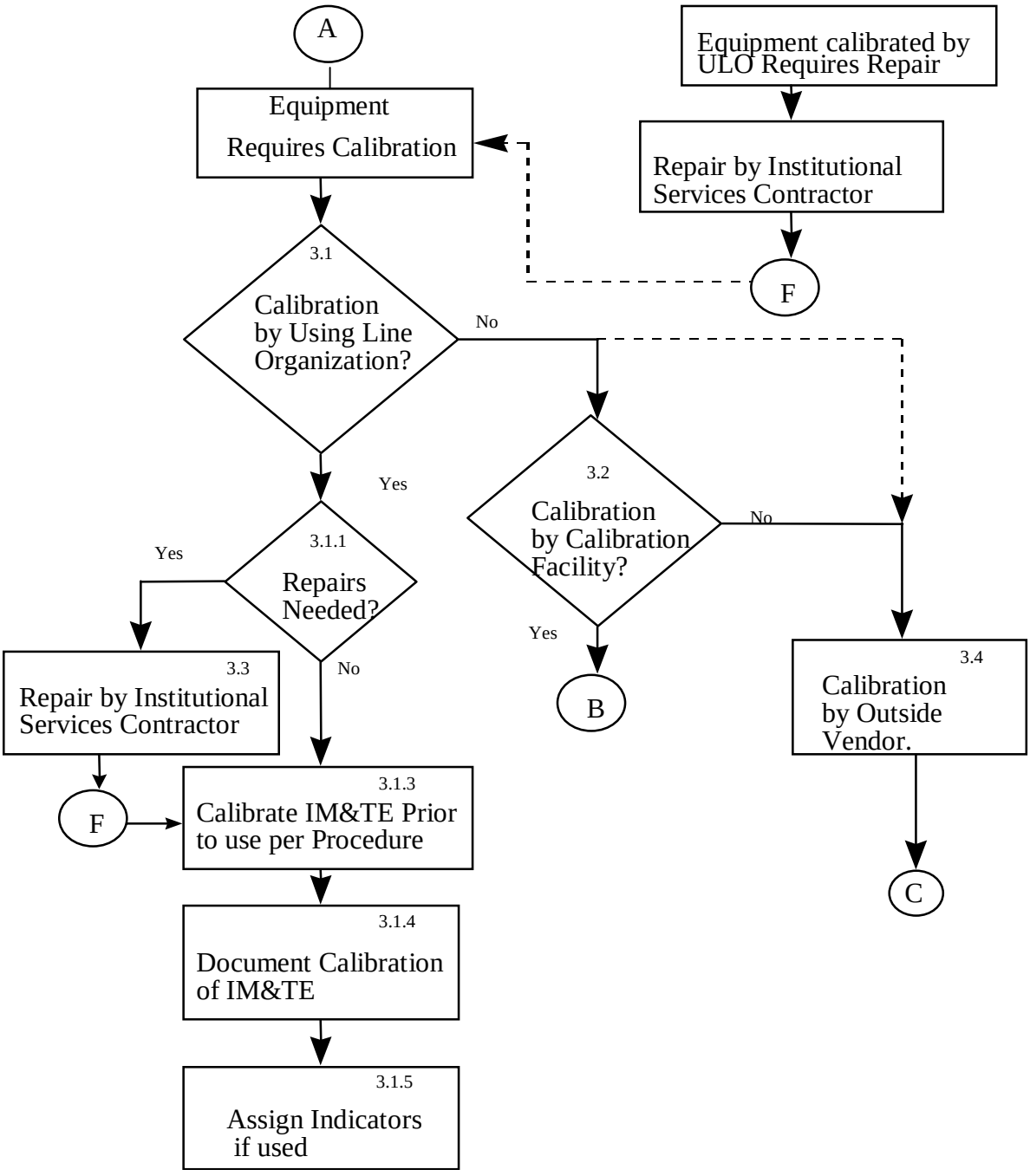
4.1.13 "Concurrence" (paragraph 2.1.25.1). The record control organization for the referenced paragraph is the ULO. The record shall be maintained until final acceptance of the affected test(s). Disposition of these records at the end of the retention period shall be determined by the ULO.

5. FLOW DIAGRAM

The following flow diagrams represent the activities outlined in the procedure for control of inspection, measuring, and test equipment:

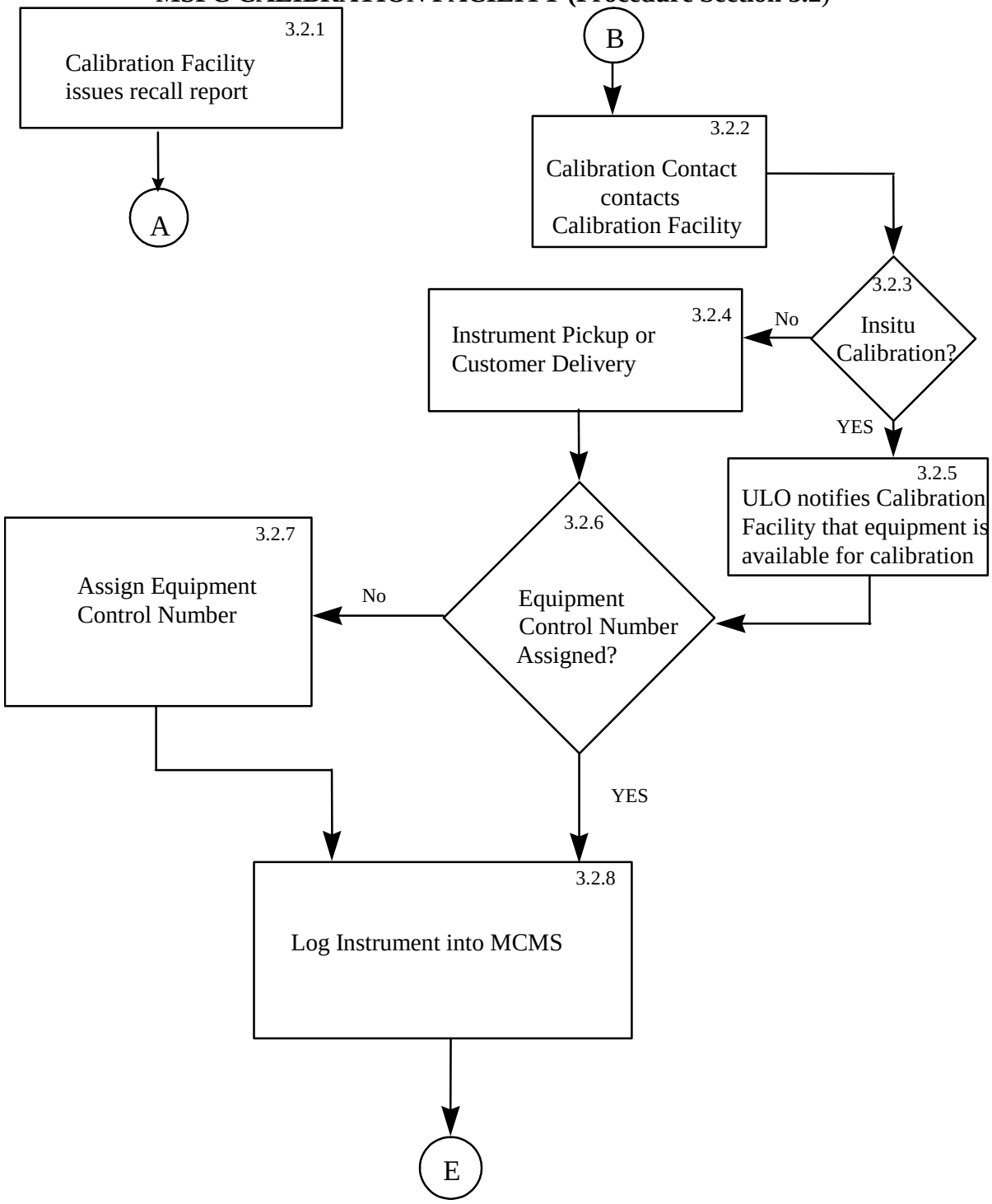
CALIBRATION FLOW PATH

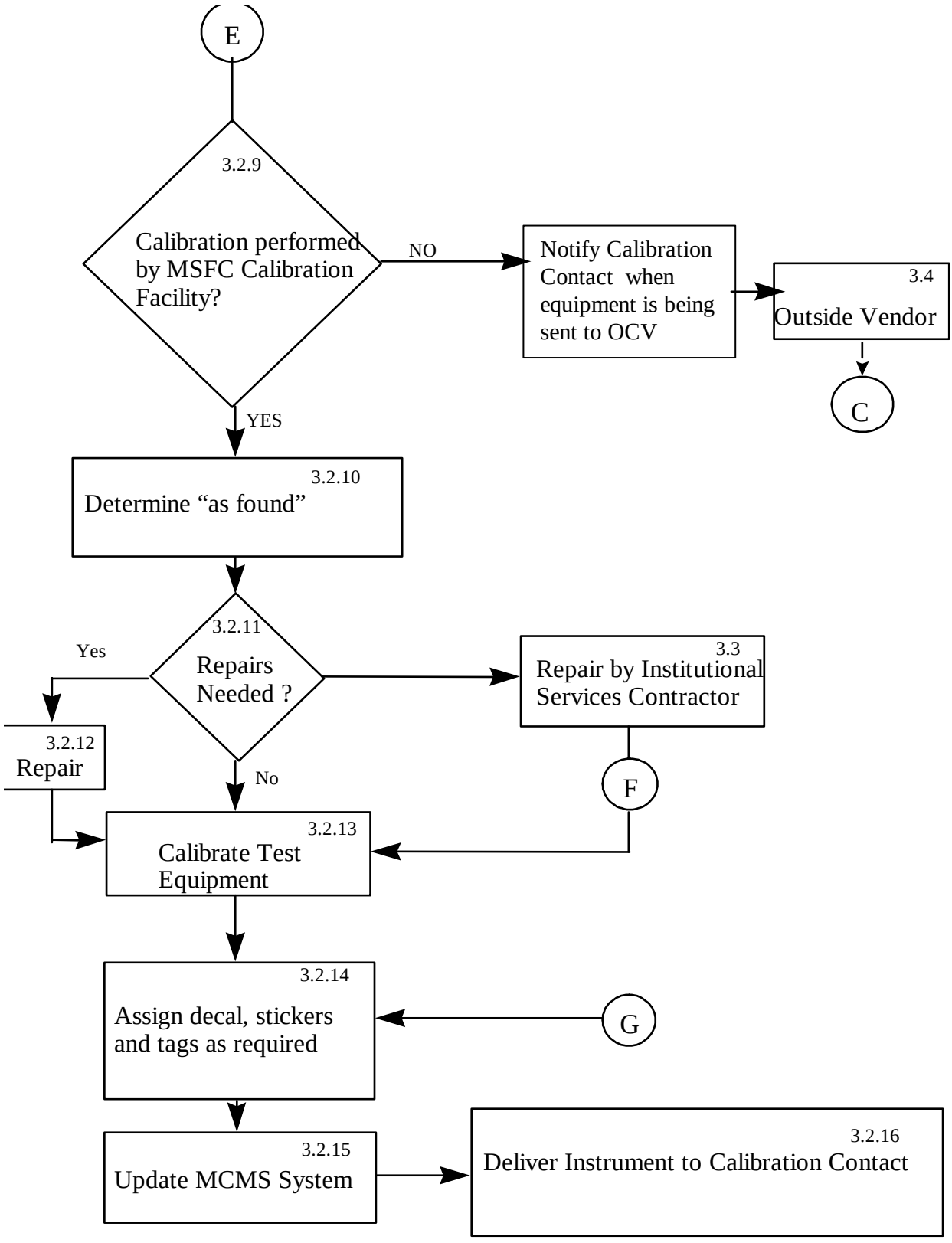
USING LINE ORGANIZATION (Procedure Section 3.1)



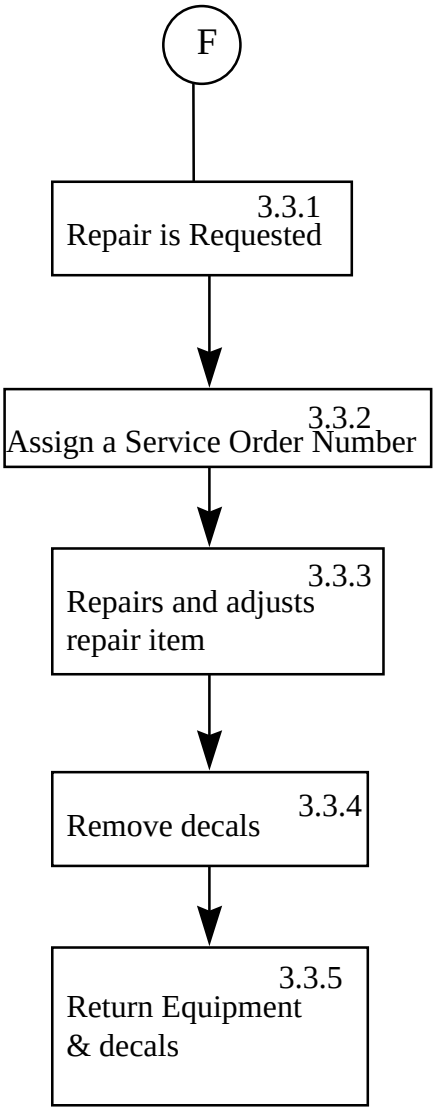
CALIBRATION FLOW PATH

MSFC CALIBRATION FACILITY (Procedure Section 3.2)

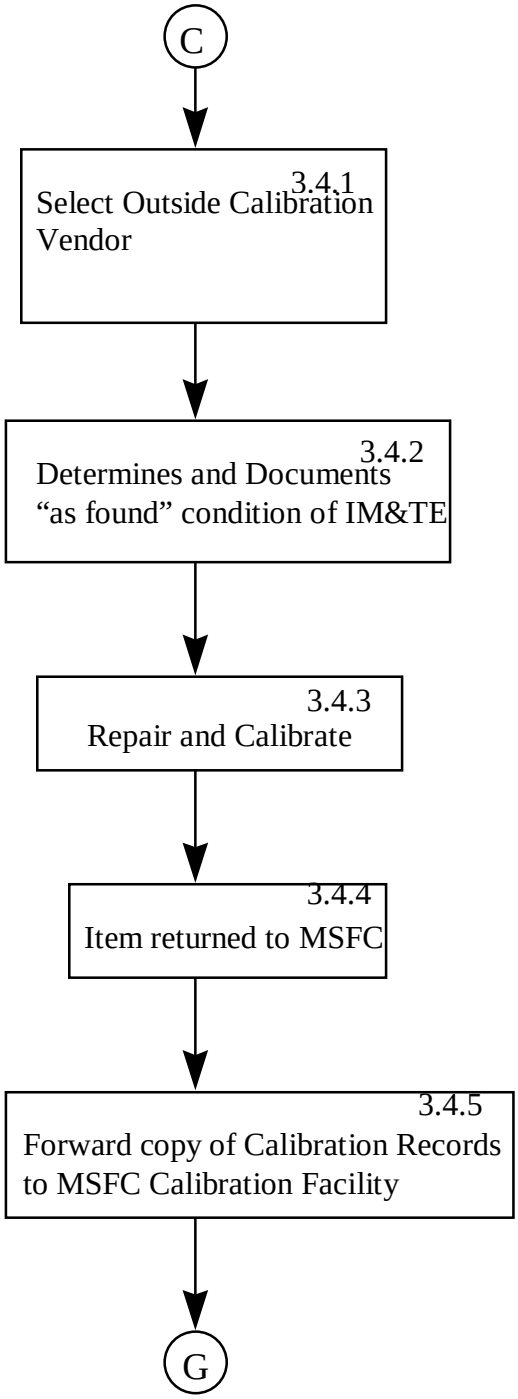



E
3.2.9
Calibration performed by MSFC Calibration Facility?
NO
Notify Calibration Contact when equipment is being sent to OCV
3.4
Outside Vendor
C
YES
3.2.10
Determine "as found"
3.2.11
Repairs Needed ?
Yes
No
3.3
Repair by Institutional Services Contractor
F
3.2.12
Repair
3.2.13
Calibrate Test Equipment
3.2.14
Assign decal, stickers and tags as required
G
3.2.15
Update MCMS System
3.2.16
Deliver Instrument to Calibration Contact

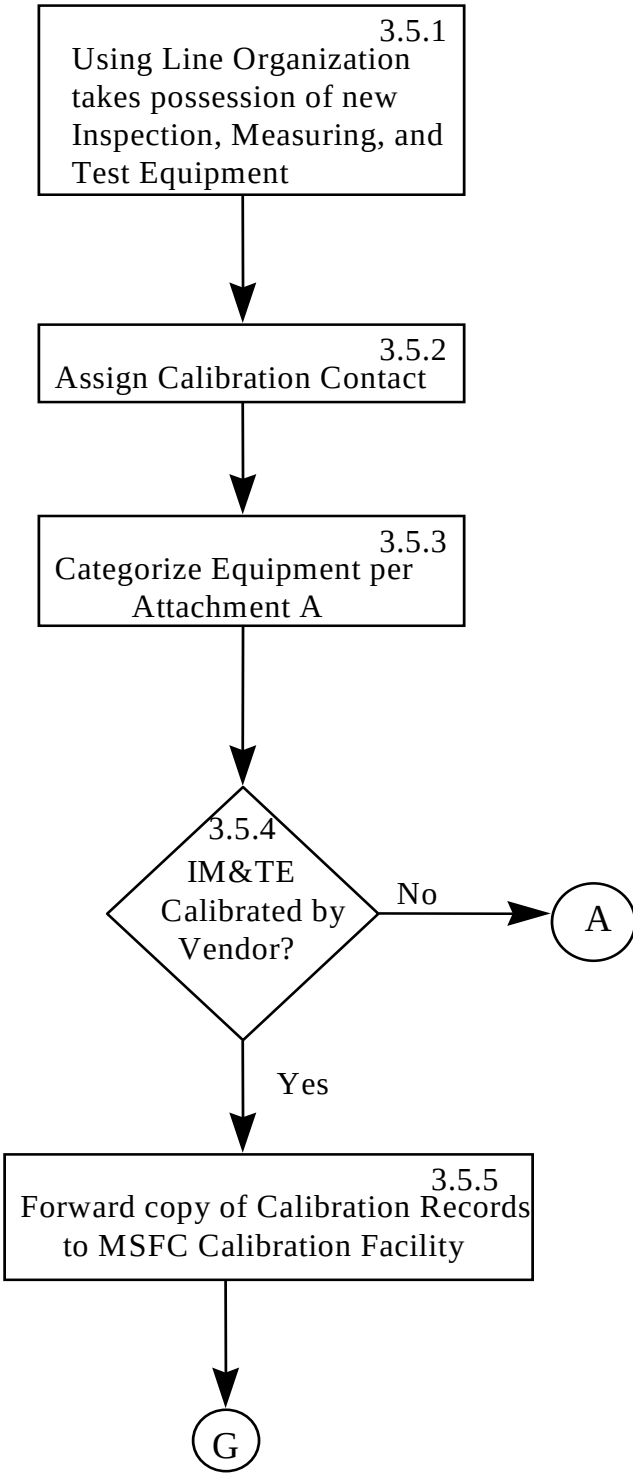
REPAIR BY INSTITUTIONAL SERVICES CONTRACTOR (Procedure Section 3.3)



CALIBRATION BY OUTSIDE CALIBRATION VENDOR (Procedure Section 3.4)



CALIBRATION OF NEW EQUIPMENT (Procedure Section 3.5)



APPENDIX A

INSPECTION, MEASUREMENT, AND TEST EQUIPMENT CATEGORY DETAILS AND INDICATOR/DECAL REQUIREMENTS

A.1 Any IM&TE utilized in a measurement process where test equipment accuracy and dependability is essential for the safety of MSFC personnel shall be included in the MCMS system, calibrated at established intervals, and labeled to indicate the calibration date along with the expiration date of the current calibration. These items shall be classified as Category I as described below to assist the ULO in maintaining the calibration status of these items.

A.2 IM&TE used to perform acceptance testing, inspections, maintenance, calibration, and/or qualification of flight hardware or ground support equipment that interfaces with flight hardware, telecommunication, transmission, and test equipment where exact signal interfaces and circuit confirmations that are essential to mission success, development testing, or special applications where the specification/end products and data are accuracy sensitive, shall be calibrated prior to use. These items shall be classified as Category I, II, or IV as described below, at the sole discretion of the ULO.

A.3 Category I – Recall – IM&TE used as described in paragraph A.1 or A.2 above. IM&TE shall be labeled with applicable decals to indicate the calibration date and due date of the next calibration. Items that are included in this category shall be recalled at established intervals by the recall system. IM&TE requiring scheduled service or scheduled maintenance should also be included in this category.

A.4 Category II - Non-recall – IM&TE used as described in paragraph A.2 above. IM&TE shall be labeled with applicable decals to indicate the calibration date and the due date of the next calibration.

Note: Frequently used IM&TE should be included as Category I. Infrequently used IM&TE should be included as Category II to reduce associated cost. A "post-use" verification is not required but shall be performed at the request of the Using Line Organization. "Post-use" verification should be considered when critical measurements are performed.

A.5 Category III - Not Calibrated - Use of Category III indicators is at the sole discretion of the ULO and shall only indicate the equipment is classified as Category III. Use of IM&TE that is not calibrated shall be limited to:

A.5.1 Applications where substantiated measurement accuracy is not required.

A.5.2 "Indication Only" purposes of nonhazardous, non-critical applications.

Note: Category III equipment can be used as incidental test equipment on flight hardware or

ground support equipment that interfaces with flight hardware to facilitate an inspection or test.

Note: Category I, Category II, or Category IV can be used for any Category III type measurement.

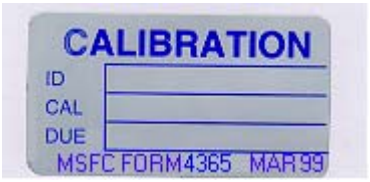
A.6 Category IV - IM&TE used as described in paragraph A.2 above that is calibrated prior to use or on a periodic basis by the ULO. The ULO accepts the responsibility of calibrating the equipment and maintaining the required documentation as described in paragraphs 2.1.6.1 through 2.1.6.4 of this procedure. Indicators may be used on this category of equipment but are not required.

A.7 Category V – Initial Calibration Only (ICO) - The MSFC Calibration Facility shall be contacted for verification that the IM&TE is appropriate for this category, and if so, shall assign a NASA Calibration Control Number to the IM&TE unless it already has an ECN, and issue a calibration decal showing the date received at MSFC as the calibration date. The due date of the calibration label shall be marked "ICO." Recalibration would only be necessary if there is a good reason to suspect the item had been altered or damaged.

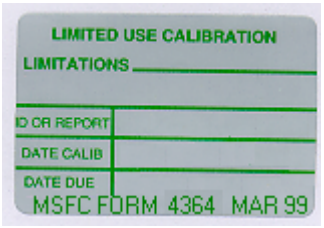
Note: The calibration due date of Category I and Category IV IM&TE calibrated on a periodic interval may not be exceeded except as provided in paragraph 1.8 and paragraphs 2.1.25, 2.1.25.1, 2.1.25.2, and 2.1.25.3.

APPENDIX B

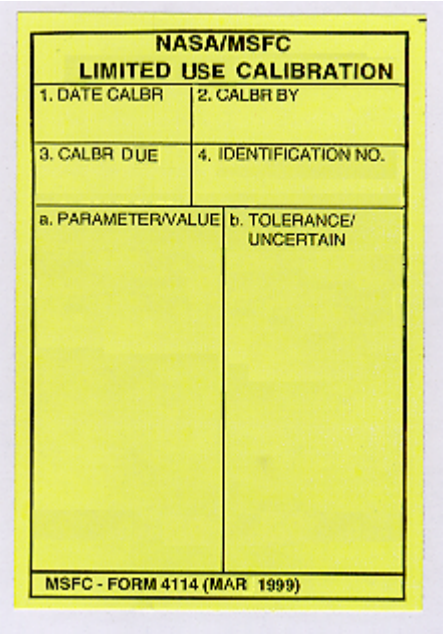
CALIBRATION DECAL, LIMITED USE CALIBRATION DECAL, AND LIMITED CALIBRATION STICKER EXAMPLES



(SILVER/BLUE)



(SILVER/GREEN)



(YELLOW/BLACK)

APPENDIX C

THE MARSHALL CALIBRATION MANAGEMENT SYSTEM WEB PAGE (http://inside.msfc.nasa.gov/CALLAB/)

C.1 The MCMS Web Page is available to MSFC personnel at Web location http://inside.msfc.nasa.gov/CALLAB/. Information displayed from the Web page is read directly from the "live" MCMS data base and is as current as the operators of the system. The Web page provides the user eight standard query features that are described as follows:

C.1.1 Calibration Contacts - The report displays the contact code, name, and organization code for each calibration contact included in the MCMS.

C.1.2 Work Order Information by ECN - The report displays open work order information for an individually specified piece of test equipment. Along with basic equipment information, the equipment category code, work order priority status, the date received, date to be returned by, and the work order status is displayed.

C.1.3 Open Work Orders by Contact Code – The report displays the complete list of open work orders for a specified calibration contact. Information displayed is similar to the report for an open work order for an individual piece of test equipment. The contact code is required.

NOTE: Open work order information is provided as information only. Work order status or failure to return a piece of test equipment to the ULO by the date shown shall not be considered a non-conformance. Closure of an open work order could lag completion by several days.

C.1.4 Search by Description - The report lists all equipment in the MCMS that contains the user's entry in the description field. The report displays basic equipment information, the calibration contact assigned to the equipment, and calibration status. This report can be useful in locating needed equipment.

C.1.5 Equipment Information by ECN - The report displays basic equipment information, category code, calibration contact, calibration status, and the organization that normally performs the calibration.

C.1.6 Equipment Information by Contact Code - The report provides a complete list of equipment for a contact code. The report is similar to the equipment report for a single piece of equipment. The contact code is required.

C.1.7 Search by Model Number - The report lists all equipment in the MCMS that contains the user's entry in the model number field. The report displays basic equipment information, the calibration contact assigned to the equipment, and calibration status. This report can be useful in locating needed equipment.

C.1.8 Equipment Expiration Next 60 Days by Contact Code - The report lists all test equipment in the MCMS that has a calibration due date appearing within the next 60 days for a given contact code. This report is not filtered by equipment category. The contact code is required.

C.1.9 Delinquent Category I Items by Contact Code - The report lists all Category I test equipment for a given calibration contact with an expired calibration. Category I test equipment listed here has already been given a 7-day grace period past its expiration date.

C.1.10 Category I Equipment List by Contact Code - The report lists all test equipment in the MCMS that has been designated Category I for a given calibration contact.

C.1.11 Category I Expirations Next 7 Days by Org Code - The report lists all test equipment in the MCMS that has a calibration due date appearing within the next 7 days for a given org code.

C.1.12 Expired Category I Items by Contact Code - The report lists all Category I test equipment for a given calibration contact with an expired calibration.

C.2 HELPFUL HINTS

C.2.1 The ECN/NASA Calibration Control Number is the primary tracking number for each piece of test equipment.

C.2.2 Numbers in the data base match the 6- or 7-digit ECN or NASA Calibration Control numbers associated with the IM&TE.

C.2.3 Some calibration contacts have an extremely large list of equipment that may overwhelm your computer. The MSFC Calibration Facility shall assign additional contact codes to individuals and redistribute equipment between the codes to facilitate data handling on request.

C.2.4 The performing organization is displayed as a guide. If the performing organization is showing ARMY, it is likely that the Army will be performing the next calibration for that item. Turnaround times for items sent to the Army are at least 30 working days.

C.2.5 Items that have been excessed are shown with a contact code of EXCESS.

APPENDIX D

MSFC CALIBRATION FACILITY CALIBRATION DATA ON THE INTRANET

D.1 Calibration data can be found on the intranet "F" drive. In order to access this intranet location, the computer being used has to map to network drive F: using the folder \\MSFCDATA4\AD-D4G. The information shall be in a folder labeled Cal Lab. Within this folder, separate file folders exist for accelerometers, flow measurement devices, load cells, LVDTs, pressure transducers, etc.

D.2 The calibration data is filed by the ECN/NASA Calibration Control number of the IM&TE. Calibration data posted at this site is maintained current by the MSFC Calibration Facility.

D.3 File "attributes" are used to provide data.

D.4 The ULO is responsible for the proper use and application of the data posted.